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CLOVERLEAF BUILDING 3 6405 METCALF OVERLAND PARK KANSAS 66202 TEL 913/432 9961

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MEMORANDUM

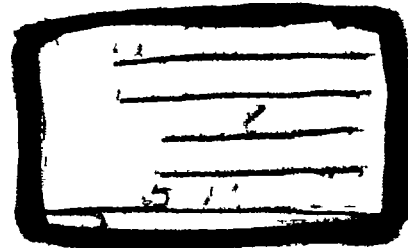
TO Paul Doherty, RPO

THRU Philip Dula, AFITOM

FROM Bob Overfelt, E & E/FIT

DATE May 17, 1988

SUBJECT Recommendations and HRS considerations for the Big River Mine
Tailing site in Desloge, Missouri
TDD #F-07-8711-039 PAN #FM00616PA
Site #Y60 Project #001
Superfund Contact Gene Gunn



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The 600-acre Big River Mine Tailings site was for 30 years the repository for mine tailings containing significant quantities of lead, cadmium, and zinc. The site is bounded on three sides by a horseshoe bend of the Big River. This site presents several complex problems including water and wind erosion, and the possibility of leachate from the on-site landfill releasing lead (Pb) and other heavy metals to the ground water and surface water.

Past investigations have documented huge influxes of mine tailings into the Big River. Severe water erosion has changed the benthic zone of the river. The river bottom is covered with a layer of mine tailings where it abuts the site and for several miles downstream. The physical state and chemical characteristics of the river bottom have been altered, and elevated Pb levels have been reported in bottom-feeding biota.

Wind erosion and airborne dust is also a major problem at this site. In certain areas mine tailings are entering the river via wind erosion. The tailings material is dolomitic sand and silt that is easily suspended in the air. During the reconnaissance this problem was especially apparent; winds were very strong and created a suspended particulate plume that traveled at least a mile over the town of Desloge. Inhalation of this dust, which contains lead, cadmium, and zinc, could be a potential health hazard.

The St. Francois County Environmental Corporation landfill is located on the site. The primary environmental concern about operating the landfill in the lead, cadmium and zinc-laden mine tailings is the acidic

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SUPERFUND RECORDS

nature of typical landfill leachate The potential for leachate from the landfill to transport these heavy metals into the ground water and surface water sources is high Monitoring wells were installed around the landfill in 1987 Samples have been taken from these wells but analytical results have not been received

St Joe Minerals Corporation and the Desloge Tailings Task Force have made a genuine, concerted effort to stabilize the tailings pile This effort continues Because this site is so immense, more stabilization work is required Further work by St Joe Minerals and the Desloge Tailings Task Force to maintain and work toward stabilization should be encouraged Their maintenance program has prevented the occurrence of catastrophic erosional events since 1985 This is a notable accomplishment, considering the relative instability and size of the pile However, the wind erosion factor and specific concerns about the on-site landfill have not been sufficiently evaluated or fully characterized

An HRS score of 58.4 has been calculated for the Big River Mine Tailings site Because of the nature of the tailings material, its location on the Big River, and the on-site landfill, all contamination routes are a major concern Observed releases were scored for the surface water and air routes with scores of 10.9 and 55.4, respectively The ground water route score is 83.8 A score of 50 was calculated for the direct contact route

The FIT recommends that a site inspection be performed to establish whether wind erosion (with its related suspended particulate problem) is creating a health hazard and to determine whether the landfill is releasing leachate that could potentially contaminate the ground water and surface water Hi-vol air monitoring should be implemented to determine total suspended particulates and lead content in ambient air on site, in Desloge, and at a background location The existing monitoring wells should be sampled to determine whether heavy metals and landfill leachate have contaminated the ground water According to Missouri Department of Natural Resources officials, a spring exists on site that empties into the Big River If so, samples should be collected from the point of entry This work should be considered a high priority

Ground Water Route

Several communities in the site area rely on the Bonnetterre and Lamotte aquifers for potable water The Bonnetterre Formation contained the lead deposits (Galena PbS) that were mined Because Pb has limited solubility in alkaline water, high concentrations of Pb in the water are generally not a problem (Ref 25) Because the aquifer is located in a

dolomitic formation, the ground water is alkaline. Therefore, the potential for Pb contamination of the ground water is reduced significantly.

Although there is justified concern about having the St. Francois County Landfill located in the tailings pile, Landfill leachate tends to be acidic. If the landfill leached a considerable amount of acidic material, then this could release the Pb contained in the mine tailings. Because the permeability and porosity of the tailings are high, this potentially released Pb could migrate into the ground water and then into the Big River. The landfill creates potential for ground water and surface water contamination.

Surface Water Route

Because the Big River Mine Tailings site is adjacent to the Big River, the potential for surface water contamination exists. The drainage from the site flows directly into the Big River. Results of studies on the chemical characteristics of the water in Big River show that the Pb content is elevated around mine tailings piles and downstream when compared to background samples. Most samples analyzed were below the 50 ug/l Maximum Contaminant Level, which is consistent with the low solubility of Pb in alkaline water. Though the benthic zone of the Big River is lined with mine tailings, the high pH of the water controls Pb solubility.

Air Route

The tailings at the Big River Mine Tailings site are a ground, dolomitic powder containing lead, cadmium, and zinc. The tailings are easily airborne and carried off site. This creates a problem with total suspended particulates as well as lead-laden particulates that also are suspended in this material (Photo C-1, Appendix C).

Receptors

The principal receptors of the lead contamination from the heavy metal contamination are:

- o people who breathe the lead-laden suspended particulates. Approximately 4,000 people in Desloge are located within a mile of the site,
- o bottom-feeding fish of the Big River, and
- o those who consume the contaminated bottom-feeding fish of the Big River.

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Direct Contact

The employees of the on-site landfill are constantly exposed to the mine tailings while at work. Also, many people use the tailings piles for recreational purposes such as riding all terrain vehicles. This activity creates dust and increases wind erosion.